

In the Claims

I claim:

Claim 1 (Currently amended): A method for identifying the sequence of a target polynucleotide, comprising:

- (i) contacting the target polynucleotide with a polymerase enzyme and ~~one of the nucleotides~~ a nucleotide selected from the group consisting of A, T (U), G, and C, under conditions suitable for the polymerase reaction to proceed;
- (ii) measuring the time taken for the polymerase to bind to and subsequently dissociate from the target polynucleotide, to thereby determine whether the polymerase has incorporated the nucleotide onto the target polynucleotide;
- (iii) optionally repeating ~~steps~~ (i) and (ii) with additional nucleotides, to thereby identify the sequence of the target polynucleotide.

Claim 2 (Cancelled)

Claim 3 (Currently amended): ~~A~~ The method according to claim 1 ~~or claim 2~~, wherein steps ~~(i) — (ii)~~ (i) and (ii) are carried out with each of the different nucleotides in turn, until incorporation is detected.

Claim 4 (Currently amended): ~~A~~ The method according to ~~any preceding claim~~ claim 1, wherein the target polynucleotide is ~~immobilised~~ immobilized on a support material.

Claim 5 (Currently amended): ~~A~~ The method according to ~~any preceding claim~~ claim 1, wherein a plurality of target polynucleotides ~~are immobilised~~ is immobilized on a support material.

Claim 6 (Currently amended): ~~A~~ The method according to ~~any preceding claim~~ claim 1, wherein ~~step~~ (ii) is carried out by measuring applied radiation.

Claim 7 (Currently amended): ~~A The method according to ~~any preceding claim~~ claim 1,~~ wherein ~~step~~ (ii) is carried out by measuring raman scattering.

Claim 8 (Currently amended): ~~A The method according to ~~any of claims 1 to 6~~ claim 1,~~ wherein ~~step~~ (ii) is carried out by applying a surface electromagnetic wave.

Claim 9 (Currently amended): ~~A The method according to ~~any~~ claim 8,~~ wherein the surface electromagnetic wave is a surface plasmon wave.

Claim 10 (Currently amended): ~~A The method according to ~~any of claims 1 to 8~~ claim 1,~~ wherein detection is carried out by measurement of a surface electromagnetic wave.

Claim 11 (Currently amended): ~~A The method according to ~~any preceding claim~~ claim 1,~~ wherein the polymerase comprises a detectable label attached thereto.

Claim 12 (Currently amended): ~~A The method according to claim 11,~~ wherein the label is a fluorophore.

Claim 13 (Currently amended): ~~A The method according to claim 11 ~~when pendent on any of claims 1 to 6~~,~~ wherein the polymerase further comprises an energy donor label or an energy acceptor label, and wherein ~~step~~ (ii) is carried out by measuring energy transfer between the fluorophore and the energy donor or acceptor.

Claim 14 (New): A method for the identification of a mutation in a target polynucleotide, comprising:

(i) contacting the target polynucleotide with a polymerase enzyme and a nucleotide selected from the group consisting of A, T (U), G, and C, under conditions suitable for the polymerase reaction to proceed;

(ii) measuring the time taken for the polymerase to bind to and subsequently dissociate from the target polynucleotide, to thereby identify whether the polymerase has incorporated the nucleotide onto the target polynucleotide, and with reference to the native sequence of the target, determine whether a mutation exists.

Claim 15 (New): The method according to claim 14, wherein (i) and (ii) are carried out with each of the different nucleotides in turn, until incorporation is detected.

Claim 16 (New): The method according to claim 14, wherein a plurality of target polynucleotides is immobilized on a support material.

Claim 17 (New): The method according to claim 14, wherein (ii) is carried out by applying a surface electromagnetic wave.

Claim 18 (New): The method according to claim 17, wherein the surface electromagnetic wave is a surface plasmon wave.

Claim 19 (New): The method according to claim 14, wherein the polymerase comprises a detectable label attached thereto.

Claim 20 (New): The method according to claim 19, wherein the polymerase further comprises an energy donor label or an energy acceptor label, and wherein (ii) is carried out by measuring energy transfer between the fluorophore and the energy donor or acceptor.